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Full Line Brochure





# AMPLIFIERS

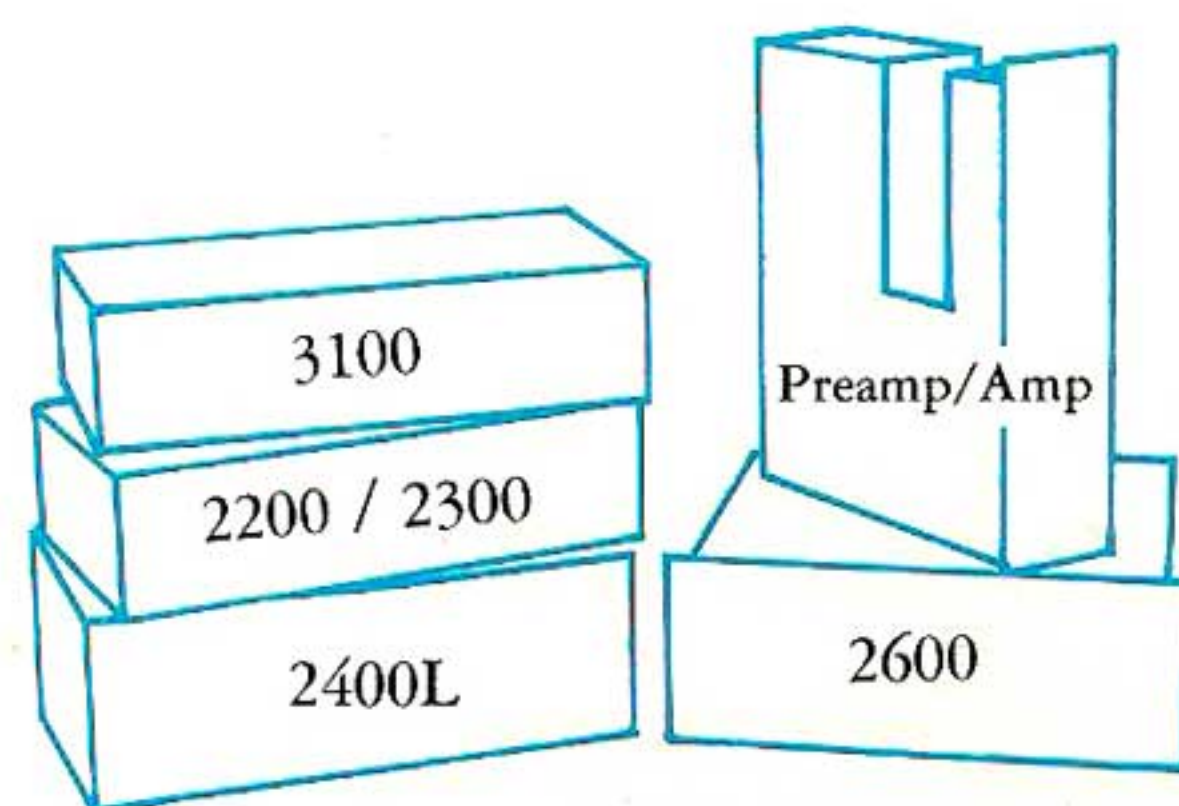
The SAE line of Stereo Power Amplifiers was developed and built with one basic philosophy, which is to incorporate the same state-of-the-art circuitry, wherever possible, in every model in the series. In the amps, the only differences in the various models are power output, and features. For this reason, we will discuss the basic circuit and construction features of the SAE amplifiers as a group instead of reviewing the individual models. No matter which model you select, SAE's philosophy ensures the finest available sonic performance and quality of construction.

## Fully Complementary Design (all models)

SAE amplifiers utilize separate drive circuits for the positive and negative half of the musical wave form (fully complementary). Although others have realized the benefits of this circuit and incorporated it in their output stages, SAE has gone much further and incorporated it throughout the entire amplifier. Fully complementary circuits ensure maximum power output and stability into any complex speaker load and the lowest in steady state and transient distortion characteristics. More important from a sonic standpoint, this approach provides the ultimate clarity and definition in the reproduction of music.

## Construction

To realize the full potential of our unique circuitry in production, SAE uses only the finest parts and testing procedures. Among these, are G-10 Mil-Spec glass epoxy circuit boards, carbon film resistors, hand selected critical components, thorough mechanical and electrical testing of individual circuit boards, sub-assemblies and finished product, plus the full power burn-in of every amplifier. The result of these efforts in conjunction with our R & D program, has been striking breakthroughs in construction. One is the almost total replacement of hand-wiring with circuit boards, for repeatability in production and ease of serviceability, and the other is the monocoque chassis which provides an extremely durable package with very low weight.



## Toroid Transformers

Another part of our continuing R & D program has been the constant research into power supply systems. The power supply plays a major role not only in the performance of an amplifier but also its effect on the outside world (i.e., stray magnetic fields which produce hum in associated components). The ideal transformer should have very high efficiency, no stray magnetic field generation and extremely low internal noise. These benefits are realized in the toroid transformer and for these reasons SAE now incorporates the toroid transformer in its power amplifiers.

## Protection

Normally, an amplifier is faced with a wide variety of environments and conditions. To ensure its reliability, the component must be adequately protected to survive all of these conditions and yet this protection must have no effect on its sonic performance. SAE incorporates several forms of protection for the variety of problems amplifiers may encounter. First, full thermal protection in case of high temperature conditions; second, signal relays to protect speakers from low frequency information that might damage them; third, electronic protection for transient overloads and short circuits. (This electronic protection is designed so that it will not effect electrostatic speaker systems.)

## LED Display (2400L, 2300, 2200, 3100)

This LED array monitors the amplifier power output. Incorporating the latest in analog digital technology, it provides fast, accurate representation of complex musical waveforms.

## Series Output (2600, 2400L)

Although the transistor is basically a high current device, previous high power amplifier designs have used them in a high voltage mode. The result is that optimum performance has not been realized from state-of-the-art transistor circuits. Our Series Output configuration allows the output transistors to operate in the correct high current mode, thus obtaining optimum performance, bandwidth and transient response. This approach provides superior slew rate and reactive load (i.e. speaker) capability compared to conventional parallel output designs.

## Preamp/Amp (2922, 3022, 3031)

These models introduce radically new thinking to the integrated amplifier market. Unlike previous designs which compromised performance for convenience, the Preamp/amps have totally separate preamplifier and power amplifier sections with circuits and circuit boards for these sections taken directly from our power amplifiers and preamplifiers. Because of this, we are including the specifications for the power amplifiers in this section, and for the preamplifier in the preamp section of this brochure.

The preamp/amps are available in these models: 2922 incorporating the 2900 preamp and 2200 power amp, 3022 incorporating the 3000 preamp and 2200 power amp, and the 3031 incorporating the 3000 preamp and 3100 power amp.

# SPECIFICATIONS

2600	2400L	2300	2200*	3100**
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Watts RMS (min.) continuous power output per channel from 20Hz to 20kHz both channels driven into 8 Ohms.

400	200	150	100	50
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Total Harmonic Distortion (THD) 20Hz to 20kHz from 250mW to rated output @ 8 Ohms.

0.05%	0.05%	0.05%	0.05%	0.05%
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Intermodulation Distortion (IM) from 250mW to rated power @ 8 Ohms with any two mixed frequencies between 20Hz and 20kHz at a 4/1 voltage ratio.

0.05%	0.05%	0.05%	0.05%	0.05%
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Signal to Noise (ref. rated output)

100dB	100dB	100dB	100dB	100dB
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Frequency response at rated output.

± 0.25	± 0.25	± 0.25	± 0.25	± 0.25
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Input Sensitivity

2.12V	1.5V	1.5V	1.5V	1.0V
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Weight

65 lb.	47 lb.	35 lb.	28 lb.	19 lb.
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Available Cabinet\*\*\*

none	C-2	C-8	C-3	C-3
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Dimensions

H	7"	7"	5.25"	5.25"	5.25"
W	19"	19"	19"	19"	19"
D	14"	12.5"	12.5"	8.5"	8.5"

\* These specifications also apply to the Amp section of 2922 & 3022.

\*\* These specifications also apply to the Amp section of the 3031.

\*\*\* Assembly Required







# PREAMPLIFIERS

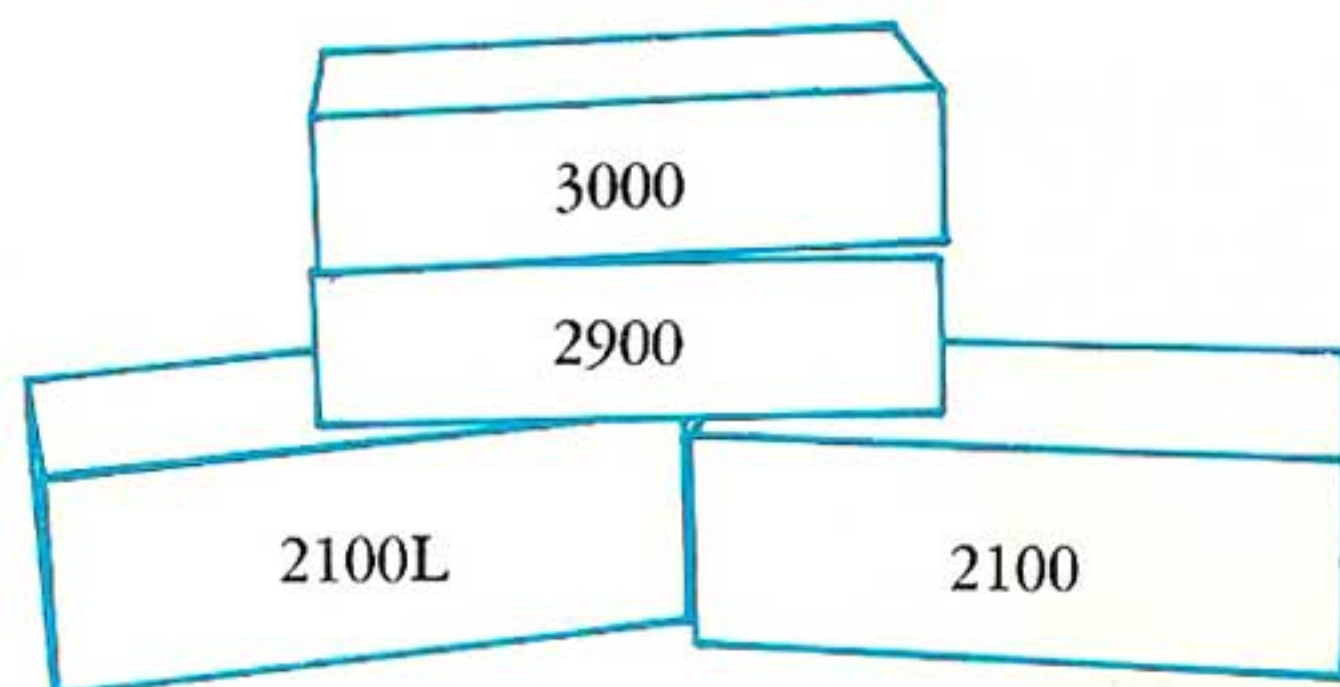
A preamplifier has two basic goals: First, to amplify accurately any input from the miniscule signal voltages appearing at the phono input, to the high levels appearing from tuners and tape recorders. Second, to provide the flexibility to optimize the features and performance of each of the components with which it is associated.

## Two-Stage Phono Circuit (all models)

Due to inherent limitations in the processing of records, conventional phono circuits have been highly susceptible to transient intermodulation distortion (TIM). This condition arises from the requirement for high frequency, high level material appearing at the phono input, and a high level of negative feedback also appearing at the phono input stage. SAE's unique two-stage phono circuit changes this concept totally. First, we break the overall amplification of this phono circuit into two stages. Second, we remove the requirement for high negative feedback at the phono input stage. In fact, we replace the requirement for this high frequency, high level negative feedback with a passive circuit which offers far superior sonic characteristics to conventional active circuits. The overall result is a much more accurate interface between the phono cartridge and the phono preamp with considerably superior sonic definition and clarity.

## Tape Facilities (all models)

To realize the full benefits of tape recording, SAE has included one of the most comprehensive tape facilities available. Among its many facets, are full tape copy, so that you may record from one tape recorder to another; tape dubbing, for connecting a tape machine through the front panel for special recording effects (except 3000, 3022, 3031); and a very special feature — tape EQ. With this feature the parametric or tone control circuits in the preamplifiers can be switched between the selector input and the tape recorders, or in the case of tape copy, between the two tape recorders. This allows you to customize your tapes (e.g., car tape players, background music, or inherent deficiencies in program source). This last feature literally makes you a recording engineer for your own material.



## Filters (all models)

SAE provides two filters: the 30Hz, 12dB/octave filter designed to remove the effect of record warp or rumble from the signal that appears at the preamp output; and a 100Hz, 6dB/octave filter to reduce low frequency peaks that occur in certain speaker/room combinations. These filters can also be switched between the selector switch and tape circuit so that when tape recordings are made, record rumble components that could otherwise ruin recordings can now be removed.

## Super Chip (2100, 2100L)

The integrated circuit has offered many advantages over discrete components. By condensing literally hundreds of parts on a single base, thermal tracking and component tolerances become problems of the past. However, previous IC designs have been oriented mainly toward instrumentation applications. Through our efforts, the first truly state-of-the-art audio IC was developed. Offering extremely low distortion, (even at full output), high slew rate, low noise and excellent transient distortion characteristics, this "Super Chip" is incorporated throughout the 2100 and 2100L preamplifiers.

## Parametric Equalizer (2100, 2900)

This tone control system was developed in the recording studio to fulfill the need for precise program control. It provides greater flexibility and a wider variety of effects than any previous tone control or equalizer system available. The Parametric EQ provides control over cut or boost, bandwidth and center frequency.

## Construction

As with our power amplifiers, only the finest parts and construction techniques have been used throughout the preamplifier circuits. Careful selection of low noise components, quality connectors, and switches has ensured the high level of performance offered by all of the SAE preamplifiers.

# SPECIFICATIONS

2100	2100L	2900*	3000**
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Total Harmonic Distortion (THD) at any level to rated output from 20Hz to 20kHz.

0.005%	0.005%	0.01%	0.02%
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Intermodulation Distortion (IM) at any rated output with any two mixed frequencies between 20Hz and 20kHz at a 4-1 voltage ratio.

0.005%	0.005%	0.01%	0.02%
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Signal to Noise ratio — Phono, ref. 10mV-20Hz to 20kHz (IHF A weighted).

80dB (95dB)	80dB (95dB)	78dB (90dB)	72dB (87dB)
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Signal to Noise ratio — High level, ref. 2.5V-20Hz to 20kHz (IHF A weighted).

100dB (110dB)	100dB (110dB)	95dB (110dB)	85dB (100dB)
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Frequency response — Phono

± 0.25dB	± 0.25dB	± 0.25dB	± 0.25 dB
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High Level

± 0.25dB	± 0.25dB	± 0.25dB	± 0.25dB
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Available Cabinet\*\*\*

C-2	C-2	C-4, C-5	C-4, C-5
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Weight

20 lb.	20 lb.	15 lb.	10 lb.
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Dimensions

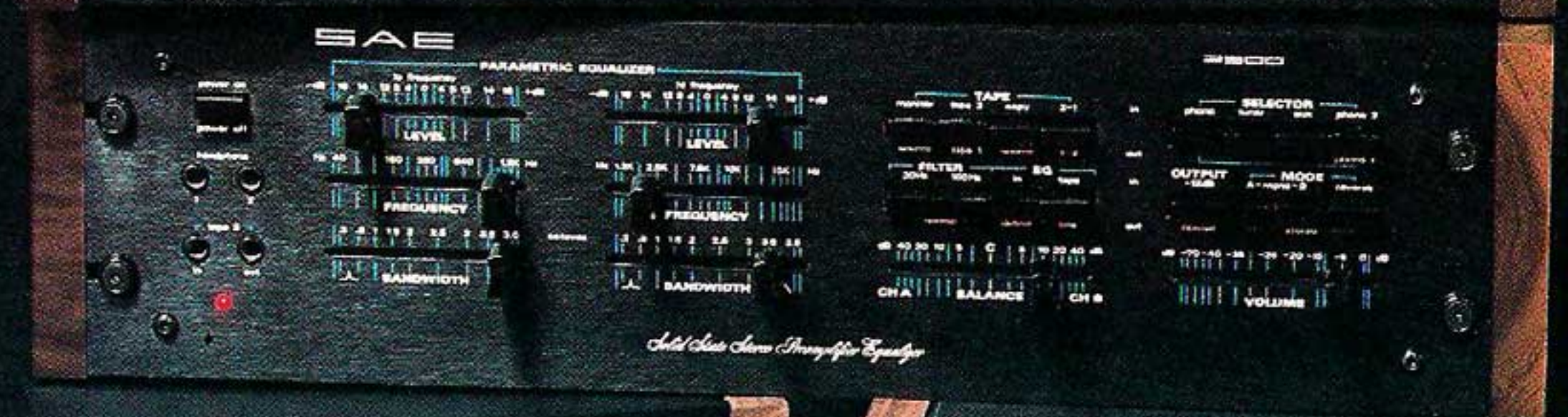
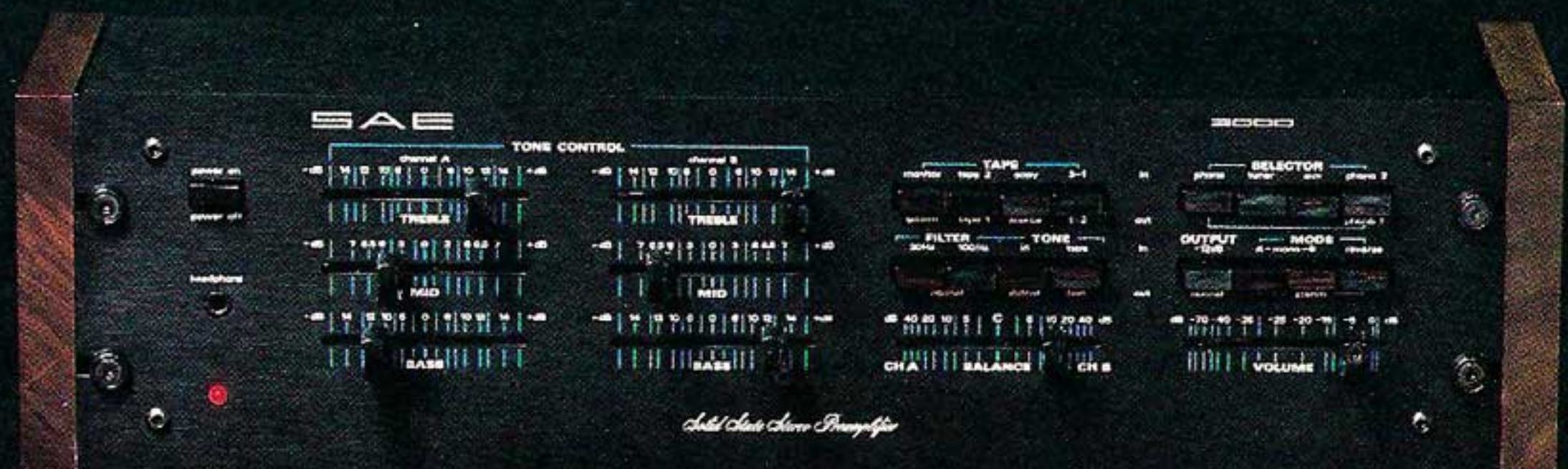
H	7"	7"	5.25"	5.25"
W	19"	19"	19"	19"
D	8.5"	8.5"	3.5"	3.5"

\* These specifications also apply to the Preamp section of the 2922 Preamp/Amp

\*\* These specifications also apply to the Preamp section of the 3022 & 3031 Preamp/Amp.

\*\*\* Assembly Required







# ASSOCIATED COMPONENTS

This group of products bears the mark of SAE quality — quality of construction and parts plus state-of-the-art performance. Each fits a specific need in today's state-of-the-art audio systems and is designed to interface perfectly with other SAE components.

## 5000 Impulse Noise Reduction System

This Impulse Noise Reduction System begins where every other system leaves off. Specifically designed to reduce the "clicks" and "pops" (impulse noises) which are present in phonograph records and other program sources, the 5000 can make playable many recordings which were otherwise considered unlistenable due to high levels of impulse noise. And, it offers this without using techniques of either bandwidth or dynamic modification.

## 4100 Time Delay Ambience System

The Time Delay Ambience System was developed so that the reality of a live performance could be re-created in the home listening environment.

The accurate recreation of live music is more than simply the reproduction of an original performance. It must also take into account the environment in which the music is performed. Conventional stereo playback systems, no matter how accurate, cannot reproduce the "ambient" environment that is created by the surroundings. The 4100 was designed to re-create this ambience. Or, with its broad flexibility, to create literally any kind of desired spatial environment.

## 4000 Electronic Crossover

The 4000 Electronic Crossover adds a new dimension to high quality speaker systems. By introducing multi-amplification to the system, each driver (i.e. woofer, tweeter, etc.) receives its' signal from a separate amplifier being driven over a more narrow range. Consequently, amplifier distortion is minimized and speaker system crossover network distortion is totally eliminated. Thus any speaker becomes cleaner and more accurate than was ever before thought possible.

## 7000 High Velocity Stereophones

These high velocity dome-radiating stereophones incorporate a unique semi-iso circuit to reduce ambient noise without removing it totally. This unique approach reduces listener fatigue without intruding on the sonic clarity of the headphones.

## Enclosures \*

SAE has developed a broad variety of enclosures to properly house SAE products and to facilitate the use of our unique components. They include our "C" cabinets, which offer solid walnut sides and are designed to be used in multi-shelf installations; our "R" and "SR" cabinets for small roll-around rack applications or where the need for a convenient expandable rack is required; or our large C-10 Professional Rack used for heavy duty broadcast, sound reinforcement, and consumer applications.

All information, illustrations and specifications contained in this manual are based on the latest product information available at the time of publication. The right is reserved to make changes at any time without notice.

\* Not Included

# SPECIFICATIONS

## 8000 Tuner

Sensitivity (—30dB noise & THD below 100% FM)	8.5dBf (1.6uV)
Total Harmonic Distortion (1kHz)	0.20%—stereo 0.15%—mono
Noise (ref. 100% mod.)	70 dB
Capture Ratio	1.5dB
AM Suppression	100dB min.
Spurious-Response Rejection	100dB min.
Image Rejection	100dB min.
Alternate-Channel Selectivity	120dB min.
Stereo Separation (1kHz) (10kHz)	45dB 35dB
Frequency Response	+ 0.5dB, 20Hz to 15kHz
H 5.25" W 19" D 11"	

<b>5000</b>	<b>2800</b>	<b>1800</b>	<b>4100</b>	<b>4000</b>
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Total Harmonic Distortion (THD) at any level to rated output from 20Hz to 20kHz.

.1	0.02	0.02	0.5	0.02
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Intermodulation Distortion (IM) at any rated output with any two mixed frequencies between 20Hz and 20kHz at a 4-1 voltage ratio.

.1	0.02	0.02	0.5	0.02
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Signal to noise ratio ref. to rated output.

90dB	95dB	95dB	95dB (front) 60dB (rear)	95dB
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Frequency Response: 20Hz to 20kHz.

± 1	± 0.25	± 0.25	(rear only) ± 1dB (50Hz-5kHz)	± 0.25
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Weight

7 lb.	18 lb.	16 lb.	15 lb.	10 lb.
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Available Cabinet\*\*\*

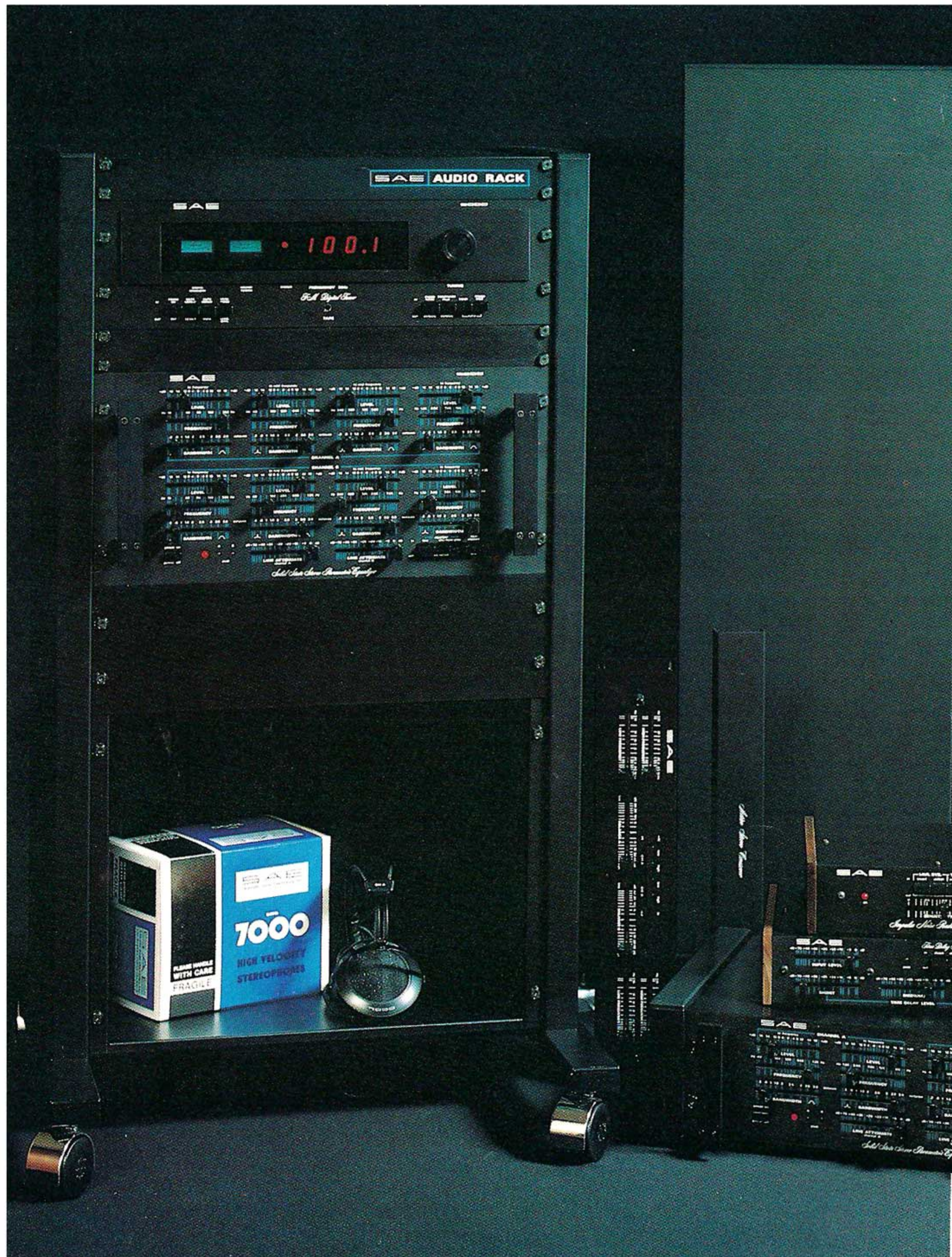
Incl.	C-6	C-4, C-5	Incl.	N/A
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Dimensions

H 2.75"	8.75"	5.25"	2.75"	3.5"
W 10"	19" (rack) (mountable)	19" (rack) (mountable)	15"	19" (rack) (mountable)
D 8"	3.5"	3.5"	8"	3.5"

\*\*\*Assembly Required





## TUNER

### 8000 FM Digital Readout Tuner

This digital readout FM tuner offers low distortion and steep quieting. Utilizing dual MOS FET circuitry, linear phase IF filters and phase lock loop multiplex section, the 8000 provides the cleanest, most accurate reception of any signal available from an FM station.

## EQUALIZERS

### 2800, 1800 Parametric Equalizers

These Parametric Equalizers introduce revolutionary thinking to program equalization. First developed in the recording studio for precise equalization during mix down, SAE has now introduced this unique tone modification system to the audio industry.

Parametric equalizers differ from conventional systems by offering not only cut or boost, as previously available, but also adjustment of bandwidth and center frequency. Both the 1800 and the 2800 offer a basic control group which allows cut or boost of up to 16dB, bandwidth adjustment from .3 octaves (for notch filtering), to over 3.5 octaves (for broad band tone modification), and center frequency adjustment. The 2800 has four overlapping ranges, (from 10Hz to 20kHz), and the 1800 has two overlapping ranges (from 40Hz to 20kHz). The 2800 and 1800 also offer tape EQ, peak indicators and level attenuators. This flexibility offers the most precise form of tone control available.

